



Division of Agricultural Sciences

UNIVERSITY OF CALIFORNIA

Amateur Rose Culture

IN CALIFORNIA




H. M. BUTTERFIELD

CALIFORNIA AGRICULTURAL
Experiment Station
Extension Service

LIBRARY
UNIVERSITY OF CALIFORNIA
DAVIS

MANUAL 13



Digitized by the Internet Archive
in 2012 with funding from
University of California, Davis Libraries

<http://archive.org/details/amateurrosecultu13butt>

Amateur Rose Culture

IN CALIFORNIA

H. M. BUTTERFIELD

UNIVERSITY OF CALIFORNIA

COLLEGE OF AGRICULTURE

Agricultural Experiment Station and Extension Service

LIBRARY
UNIVERSITY OF CALIFORNIA
DAVIS

THIS MANUAL is one of a series published by the University of California College of Agriculture and sold for a charge which is based upon returning only a portion of the production cost. By this means it is possible to make available publications which, due to relatively high cost of production, or limited audience, would otherwise be beyond the scope of the College publishing program.

CONTENTS

	Page
The hybrids and their progeny	2
Classes or groups	2
Modern roses	5
Select varieties adapted to climate	6
Zones	6
Cultural practices	10
Planting	10
Irrigating	12
Tillage	13
Fertilizing	15
Propagation	15
Home method	15
Commercial method	15
Insects and diseases	17
Insects	17
Diseases	20
The combined spray program	22
Spray combinations	22
Use of sprays and dusts	23
Pruning	25
When to prune	25
How to prune	26
Grading and appraising techniques	30
Grading for sale	30
Appraising exhibition blooms	30

This manual replaces Extension Circular 148



At the Oakland Municipal Rose Garden rose fanciers have an opportunity to see the best varieties and the best methods of pruning.

THE AUTHOR

H. M. Butterfield is Agriculturist in Agricultural Extension, Berkeley.

DECEMBER, 1953

Amateur Rose Culture

IN CALIFORNIA

H. M. BUTTERFIELD

THE WILD ROSE was the first rose described as growing in California. Spanish settlers saw it along the trail from San Diego to San Francisco in 1769. They called it the Castilian rose—probably in memory of the pink rose they had left in Spain, *Rosa damascena* var. *trigintapetala*. Later, upon settling, they imported the Castilian rose from the old country and planted it in the mission and rancho gardens and in the cemeteries.

Eighty years later, settlers described two roses growing in California. One was the same pink Castilian rose of earlier days; the other was a white variety growing at Mission San Jose. Probably the latter was either the single White Cherokee or the Lamarque, both introduced in Europe in the early part of the nineteenth century.

In 1849 nurserymen brought to San Francisco such popular roses as Austrian

Copper (introduced in Europe at the end of the sixteenth century) and White Banksia (Europe in the early nineteenth century). Among many others were Gloire des Rosomanes (Ragged Robin), Cloth of Gold (Chromatella), Gold of Ophir, Niphetos, and Fortune's Yellow, all early nineteenth-century European roses. Many of these varieties still grow in old California gardens.

By 1856, rose culture in the state had grown so rapidly that Louis Prévost, a nurseryman at San Jose, listed some 20,000 rose plants for sale. By 1858, a San Francisco nurseryman, William C. Walker, grew between 400 and 500 rose varieties. By 1949, the value of field-grown and greenhouse roses in the leading counties of the state was more than seven and a half million dollars. The total reported in the 1950 United States Census appears in table 1.

THE HYBRIDS AND THEIR PROGENY . . .

These may be placed in certain large classes or groups: hybrid tea, hybrid perpetual, tea, floribunda, polyantha, noisette, Cherokee, Irish single, and miscellaneous.

CLASSES OR GROUPS

Rose growers are interested primarily in the many rose hybrids and their progeny. Certain fanciers are interested only in rose species; that is why such species as Banksia, Austrian Copper, *Rosa hugonis*, and *R. wichuraiana* are still grown in California gardens. Commercial growers are also interested in the wild stocks

that have provided *R. multiflora* and *R. odorata*—the Chinese tea rose—or in hybrids between species, such as manetti.

Several years ago the hybrid perpetual, tea, and noisette were highly popular. The multiflora, the moss, and the pernetiana also claimed some interest, but at present hybrids in these groups are seldom grown.

A POPULAR HYBRID TEA ROSE . . .



Charlotte Armstrong is a fine specimen of the hybrid teas. It is one of the most popular of the All America Award roses.

The hybrid perpetual class was originated in 1835 by crossing the old Damask perpetual with the Bourbon rose to secure a vigorous race. This cross is usually well represented by Frau Karl Druschki and occasionally by Paul Neyron and Ulrich Brunner. It is also represented by American Beauty.

Tea roses. These roses were named for their tea scent. Many roses of this group had a relatively weak habit of growth. Among them, for instance, were Lady Hillingdon, Marechal Niel, and the various Cochet roses.

Noisette. This was noted for its vigorous climbing habit and ease of culture. It required little pruning. Cloth of Gold, Gold of Ophir (Ophirie), Lamarque, and William Allen Richardson are occasionally seen today in old gardens. They are representative of this class.

Multiflora group. Included in this group are the polyantha and some of the ramblers. Cecile Brunner, Baby Rambler, and Yellow Rambler are old varieties in this class. All varieties of the multiflora group are characterized by small flowers borne in clusters.

AND A POPULAR FLORIBUNDA



Red Ripples is one of the newer varieties among the long-blooming floribundas to meet with great approval.

A POLYANTHA . . .

The bush polyantha Etoile Luisante produces rather small but very symmetrical flowers. Its buds are flame colored.



There is still some interest in the single rose. One of the best of the climbing singles is Dainty Bess.

AND A SINGLE



Considerable publicity has been given to *Rosa multiflora* as a hedge plant in states with summer rainfall. The majority of rose specialists agree that this rose cannot be expected to grow well in most parts of California without irrigation. Few gardeners would be interested in the small flowers of this rose species. Furthermore, the plant makes a high, rounded mound, and will not produce a narrow, compact hedge. The rose is deciduous, also a disadvantage where an evergreen hedge is planned.

Moss rose. The mosslike glands covering the sepals give this rose its name. The moss rose is particularly interesting in the bud, but not so in full bloom.

Pernetiana group. This group, which resulted from a cross between Austrian Copper and one of the hybrid perpetuals, was represented by Juliet and Mme. Edouard Herriot.

Hybrid teas. These roses, developed mostly in the last forty years, have almost entirely replaced the tea roses. They were originated by crossing the tea roses with the hybrid perpetual roses. Mme. Butterfly of this group is still a popular rose. Charlotte Armstrong is another fine specimen.

More recently, certain briar blood characteristics, such as colors of old gold and flame red, were introduced from the pernettiana group. Hybrid tea roses were used later in some of the crosses. The intense copper in some of our modern hybrid teas is inherited from the Austrian briar.

Polyantha roses. These produce very small flowers, often borne in clusters. Cecile Brunner in climbing form and Etoile Luisante, in bush, illustrate this group very well.

Floribunda group. Included in this group are certain roses formerly listed as hybrid teas or as hybrid polyanthas. This group includes the large-flowering polyanthas, such as Rosenelfe; and the low, compact-growing hybrid teas, such as Snowbird and World's Fair, which have

flowers up to perhaps 4 inches in diameter, in a wide range of colors. Some of the newer varieties among the floribundas, such as Red Ripples and Pinocchio, have become very popular. The long blooming period of hybrid teas makes them especially valuable for sprays and color effect.

Single roses. There is still some interest in the Irish single roses, such as Irish Elegance, and the Cherokee roses, such as Pink Cherokee. Fortune's Yellow, a miscellaneous rose, is thought by some to be a hybrid between the Cherokee and the Banksia. In California, Fortune's Yellow is known both as Beauty of Glazewood and as San Rafael. One of the best climbing singles is Dainty Bess.

Ragged Robin of the Bourbon group is still a popular rose for planting around orchards, but to thrive in our dry climate it needs water. Some hybrid teas also are grown as hedge plants and they, like Ragged Robin, need water. The Ragged Robin is one of the best stocks on which to propagate roses.

MODERN ROSES

Bush roses and climbers. Beginning gardeners always want a list of some of the best modern roses to plant in the small home garden. Tables 2 to 8, at the end of the manual, are lists of roses with comments about color and growth.

The roses are divided into bush and climber. Many of the popular bush roses are listed in table 3. These are also grown as standard or tree roses, for use mainly in formal gardens or where space is limited. Some of the very popular climbing hybrid tea roses appear in table 4. Many of the most popular have been developed from bush roses by mutation.

All America Awards. In 1940 the yearly practice began of granting the All America Awards to the best introductions each year (see table 7). Rose fanciers have benefited by the consensus of sixteen competent judges throughout the United States.

SELECT VARIETIES ADAPTED TO CLIMATE . . .

One classification of climate gives six primary zones in the state: Beach, Coastal Plain, Transition, Inland, Desert, and Mountain.

The fact that California has almost as many types of climate as may be found in the rest of the United States makes it difficult to say that any specific rose variety is adapted to the state. Fortunately, many varieties seem to do well in any climate. These include Charlotte Armstrong, Condesa de Sastago, Helen Traubel, Joanna Hill, Signora, and Pinocchio.

Varieties needing a cool climate, or at least one not too hot, include Bright Wings, California, Diamond Jubilee, Eclipse, Fandango, First Love, Floradora, Forty-Niner, Fred Edmunds, Mrs. Sam McGredy, Night, Nocturne, Poinsettia, Rubaiyat, Saturnia, Sutter's Gold, Sweet Sixteen, and Taffeta. These develop their best color in the cooler climates. Peace also requires a cool climate for development of its best color. On the other hand, a variety such as Mirandy or Chrysler does best with heat and no fog. Mirandy is therefore well adapted to inland and desert areas, but is practically worthless near the coast.

Some rose specialists have suggested defining six climatic areas and listing popular varieties adapted to each area. These areas form the zone map on the opposite page. A list of certain rose varieties adapted to each zone appears on pages 8 and 9. There is no very distinct limit for the zones, although some general outline may be given.

ZONES

Beach. This area is exposed to the ocean along the California coast from San Diego County to northern California. In this zone, 325 days of the year are normally above freezing and the mean summer temperature ranges under 70° F.

Coastal Plain. This zone lies just back of the Beach area. Here the summer

temperatures rise to 75° F, with a normal range of 250 to 325 days above freezing. The cooling effect of the ocean is evident in the growth of roses, but the air is not so damp as in the Beach area.

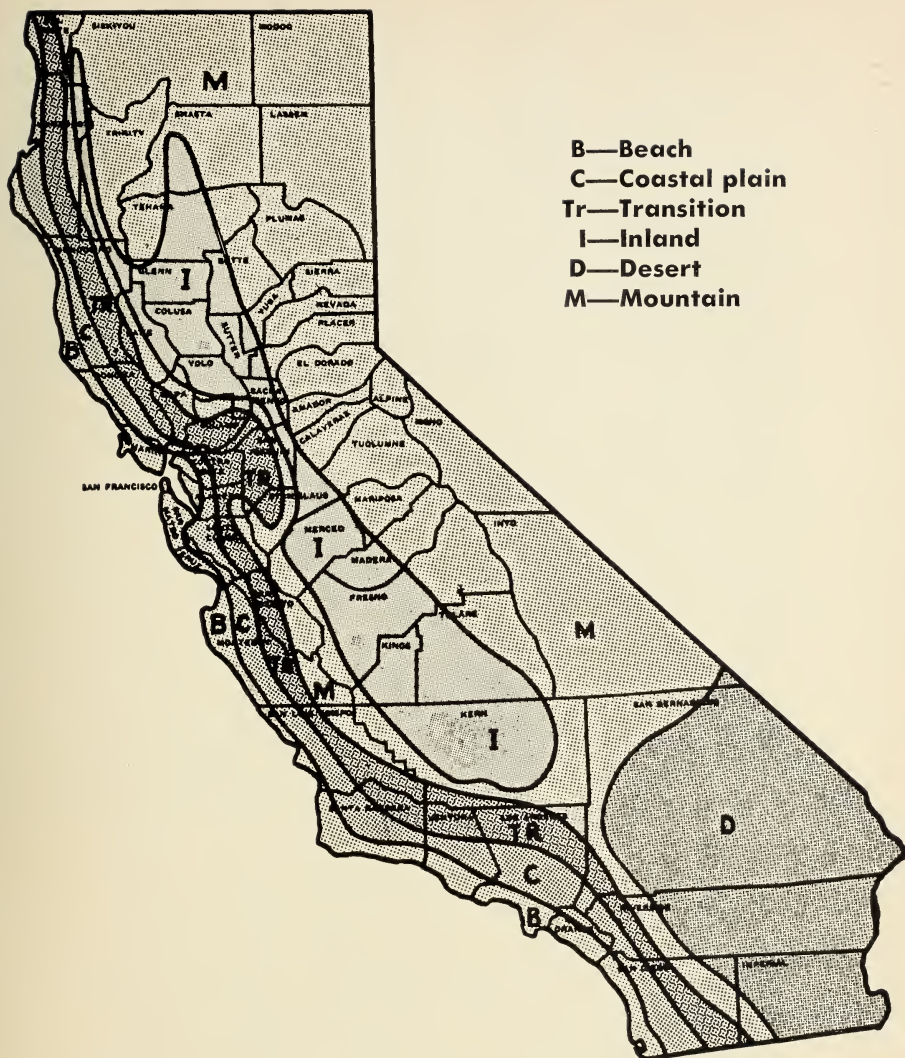
Transition. This zone lies between the Coastal Plain and the hot Inland area. This may be limited to certain islands on the map—for instance, where the rivers converge in central California or where citrus does well in some of the inland areas. A normal growing season of 200 to 275 or more days exists. The mean winter temperature is about 65° F, and the mean summer temperature may reach 75 to 80°.

Inland. This area is exposed to high summer temperatures which often reach 100° F or higher. There are about 225 days or more above freezing in the Inland area.

Desert. The Desert area is limited to an inland zone of southern California where about 250 days or more are above freezing, and where the mean summer temperature reaches about 90° F. The mean winter temperature in the Desert area may be as high as 65°, although the nights are cold.

Mountain. This zone is confined to the higher elevations, where heavy freezes occur in winter and frosts may occur in almost any month of the year. There may be only 100 to 200 days above freezing during the year, which means a short growing season. In parts of the Mountain area, rose canes may be killed back unless a very hardy variety is planted, such as some of the *Rosa rugosa* hybrids.

It is possible, in one small publication, to classify only a few of the many varieties of roses adapted to these climatic zones. A local nursery can furnish the names of more varieties adapted to your climate.



Find your location on this map . . .

The outlines on this map are approximate only. Some exceptions will be found within the boundaries shown.

Choose suitable varieties from the table



SOME VARIETIES OF ROSES ADAPTED TO THE SIX ROSE ZONES OF CALIFORNIA *

Variety and petal number †	Rate of bud opening	Beach	Coastal Plain	Transition	Inland	Desert	Mountain
CHARLOTTE ARMSTRONG 20-25	Medium rapid	Fair in spring and summer. Good in fall	Fair in spring. Good in summer and fall	Good in all sea- sons. Excellent in fall	Good in all sea- sons. Excellent in fall	Good in spring. Poor in summer. Excellent in fall	Good in spring and fall
DEBONAIR 25-35	Medium rapid	Poor in spring. Good in late summer and fall	Poor in spring. Good in late sum- mer and fall	Fair in spring. Good in summer. Excellent in fall	Good in spring. Fair in summer. Excellent in fall	Good in spring. Faded and small in summer. Fine in fall	Poor in spring. Fine in summer and fall
DIAMOND JUBILEE 45-55	Slow	Poor	Poor, except in late fall	Poor in spring. Fair in summer. Excel- lent in fall	Good in spring. Faded in summer. Fine in fall	Fine in spring. Faded in summer. Excellent in late fall	Fine in summer and fall
ECLIPSE 10-22	Rapid	Fine in spring, summer, and fall	Fine in spring. Faded in summer. Excellent in fall	Fine in spring. Faded in summer. Excellent in fall	Fine in spring. Faded in summer and early fall. Good in late fall	Excellent in very early spring and late fall. Faded in summer	Fine in spring and fall
GRANDE DUCHESE CHARLOTTE 18-20	Medium rapid	Poor in spring. Fair in sum- mer. Good in fall	Poor in spring. Good in summer and fall	Fair in spring and summer. Excellent in fall	Fine in spring. Poor in summer. Excellent in fall	Good in early spring and late fall	Good in spring and fall
HIGH NOON 15-20	Rapid	Fair in spring. Good in sum- mer and fall	Good in all sea- sons	Excellent in spring. Fair in summer. Fine in fall	Good in spring. Poor in summer. Excellent in fall	Fine in spring. Poor in summer and early fall	Fine in spring and fall
KATHERINE T. MARSHALL 15-20	Rapid	Good in all seasons	Good in all seasons	Good in spring. Fair in summer. Excellent in fall	Good in spring. Poor in summer and early fall. Fine in late fall	Fine in spring. Poor in summer until very late fall	Fine in fall

LOWELL THOMAS 15-18	Rapid	Good in spring. Fair in summer. Excellent in fall	Good in spring and summer. Excellent in fall	Excellent in fall or spring. Poor in summer	Good in spring. Poor in summer. Excellent in fall	Fair in spring. Poor in summer. Excellent in fall	Good in spring. Faded in summer. Excellent in fall
MIRANDY 35-50	Slow	Poor	Poor. Fair in late fall	Good in fall only	Excellent in summer and fall	Excellent in spring and fall	Excellent in summer and fall
PEACE 50-65	Slow	Poor, except in late fall	Poor in spring and early summer. Good in fall	Poor in spring. Fine from July on until November first	Good in spring. Fair in summer. Fine in fall	Good in spring. Faded in summer. Fine in fall	Good in summer and fall
SAN FERNANDO 16-25	Medium rapid	Poor in spring. Fair in summer. Fine in fall	Fair in spring. Good in summer. Excellent in fall	Fair in spring. Good in summer. Excellent in fall	Fine in spring. Fair in summer. Good in fall	Fine in spring and late fall	Good in summer and late fall
SHOW GIRL 15-20	Medium rapid	Fair in spring. Excellent in fall	Fair in spring and summer. Excellent in fall	Good in spring. Fair in summer. Excellent in fall	Good in spring. Poor in summer. Excellent in fall	Good in spring. Poor in summer. Excellent in fall	Good in spring and fall
SWEET SIXTEEN 16-20	Rapid	Excellent in spring, summer, and fall	Good in spring and summer. Excellent in fall	Excellent in spring. Fair in summer. Excellent in fall	Good in spring. Poor in summer. Excellent in fall	Fair in spring. Poor in summer. Excellent in fall	Good in spring. Excellent in fall

* Prepared by Walter E. Lammerts, La Cañada, California.

† Records are not available to show the number of petals on all varieties of roses or how rapidly the flowers open in hot weather. Some of the newer roses have the following number of petals: Applause, 40-50; Buccanero, 30; Capistrano, 36; Chryster, 50; First Love, 25; Floradora, 25; Forty-Niner, 25-40; Fred Edmunds, 20-25; Fred Howard, 50; June, 40; Mme. Henry Guillot, 25; Mme. Chiang Kai-shek, 24-30; Suter's Gold, 24; Taffeta, 21. Other varieties have been described in general terms, as Chief Seattle, many petals; Countess Vandal, good in any weather; Debonair, many petals; Girona, fully double; Helen Traubel, good in any weather; Nocturne, lasts well; Snowbird, many petals; Tallyho, fully double. The Chief, best in hot weather. Varieties like Mirandy and Fred Howard, with up to 30 petals are known to open too slowly to be at their best in cool weather, so are best in hot weather. On the other hand, varieties with 25 or fewer petals, such as Suter's Gold, may open too fast in hot weather to be good and are at their best in cool weather. A few varieties like Charlotte Armstrong, with only 20 to 25 petals, seem to open well from the Transition Zone and farther inland, but are only fair near to the coast in the spring. In general, the varieties with many petals need considerable heat to open well, while varieties with few petals open too fast in hot weather to be satisfactory.

CULTURAL PRACTICES . . .

These include planting, transplanting, staking, irrigating, and fertilizing.

PLANTING

Selecting the location. Roses thrive in a sunny location free from strong wind. They will grow in almost any well-drained, fertile loam soil, but cannot be expected to do well in soils containing excessive amounts of alkali salts or other harmful chemicals.

Need for well-drained soil. The soil that is well drained protects the bush against possible root injury. If the soil is too heavy with poor drainage, put a layer of gravel or peat moss in the bottom of the planting hole. Do not attempt to plant roses where the soil is poorly drained. Remember, on the other hand, that sandy soils dry out faster than heavier soils.

Need for sun. Roses must be planted in full sun or where there is a reasonable amount of sun during the day. When grown in shade they are more susceptible to attack by mildew than when grown in full sun.

Growers in the hot interior valleys will probably find that the flowers bloom faster than those grown in a cool climate. In these areas a location protected from some of the hot afternoon sun might give better results.

Danger of frost. In most parts of California roses are not injured by freezing, although in the high mountains they may require some protection. Unseasonal frosts could, of course, damage new growth.

Condition of nursery plant. Most nurserymen selling rose bushes make every attempt possible to keep the bush in good condition for planting on delivery. Many bushes are coated with wax to prevent excessive drying out. Occasionally, however, conditions arise over which a nurseryman has little or no control. Something may cause the roots to dry out excessively. If this happens, the plant may start growth very slowly, or it

may not start at all unless given special treatment.

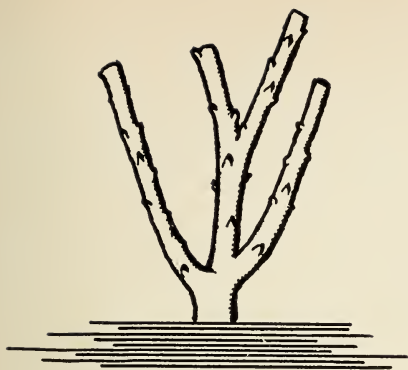
Special treatment consists of restoring moisture to the dry bush. Either soak the roots in water or, better still, cover the plant with moist soil for several days—even for a week or longer—until the tissues have taken up the normal amount of moisture.

Usually a rose bush is shipped while dormant, with bare roots snugly wrapped in moist sphagnum moss to prevent drying out. Therefore, only occasionally will a bush be so badly dried out on arrival that it cannot recover by either of these treatments. The important thing is to have the bush dormant and the tissues plump at the time of planting. If the tissues are severely dried out, the bark will be shriveled.

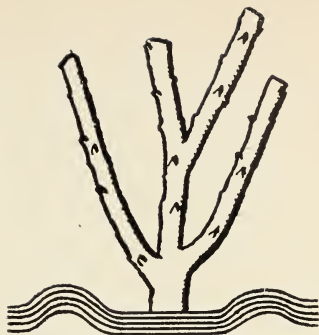
Bushes with bare roots must be set out well in advance of the appearance of new growth.

Time to plant. The best time to plant roses in California extends from the middle of January on into February, or as long as healthy dormant bushes—ones that shed their leaves in winter—can be purchased. There is much more trouble about dieback on bushes planted as early as December than on those planted later. Especially is this true of such varieties as Golden Emblem, whose canes are somewhat subject to dieback. (See Brown Canker, p. 21.)

Planting the bush. The planting hole should be somewhat larger than the root system. The best soil is piled at the side to fill in around the roots later. The roots are spread out in normal position, with the moist soil sifted in about them. Finally, the soil is firmed snugly with the foot so that the bush stands at approximately the same depth at which it stood in the nursery. Allow for settling after planting and for the addition of mulch.



Firm the soil about the stem at planting so the bush will stand as deep as it stood in the nursery.



Leave a basin around the plant for irrigation until the bush is well established.

Depth of planting. Planting too deep leads to weak lateral growth. Depth should be measured after the soil is fully settled by irrigation. The soil should not cover the stem more than 2 inches above the place of bud union; and it is best to have the bud union about even with the surface of the ground after the soil is settled.

Eastern rose growers often plant bushes very deep to keep the canes above the bud union from being killed in freezing weather. There is no need for such deep planting in California. In fact, the best new canes will develop close to the bud union if the bush is not planted too deep.

Supporting the bush. All standard or tree roses should be staked carefully and tied so that the canes will not break in a strong wind. Climbing roses will ultimately need support, such as a wall, lattice, or fence—whatever local conditions require.

Transplanting. Occasionally a rose bush must be transplanted, or a balled or canned rose may need to be set out after buds have started growth or following very hot weather. If so, be certain that the soil around the roots, or in the can or ball, is moderately damp so that it will not crumble and expose the roots. Prune back and thin out the top to counteract

any loss of roots. Then protect the plant from sunburn for a few days with burlap or some other covering. This latter precaution will help to give the bushes a good start.

Replacing the declining plant. A good rose bush, properly cared for after planting, can be expected to produce



Stake and tie a standard or tree rose to keep the canes from breaking in a strong wind.

satisfactory flowers for perhaps fifteen years or longer. In time, however, the bush may decline, and when that happens, replacement is necessary.

Another reason for replacement should be mentioned. Better rose varieties are constantly being introduced, or roses with a different appeal, so that, as the older roses begin to decline, the grower may wish to replant with one of the newer varieties. In this way, the rose garden holds the interest of the public. On the market are many roses considered superior to most of the roses grown fifteen to twenty years ago. Some of these, for instance, are more resistant to powdery mildew than the older roses.

Replanting should not be done until the cause of decline is known, since oak fungus, excessive alkali, and other troubles may require some kind of soil treatment to make replanting safe. Then follow the same cultural practices used in the original planting.

Run a gentle stream of water around the plant until the ground is wet down to at least 2 feet.

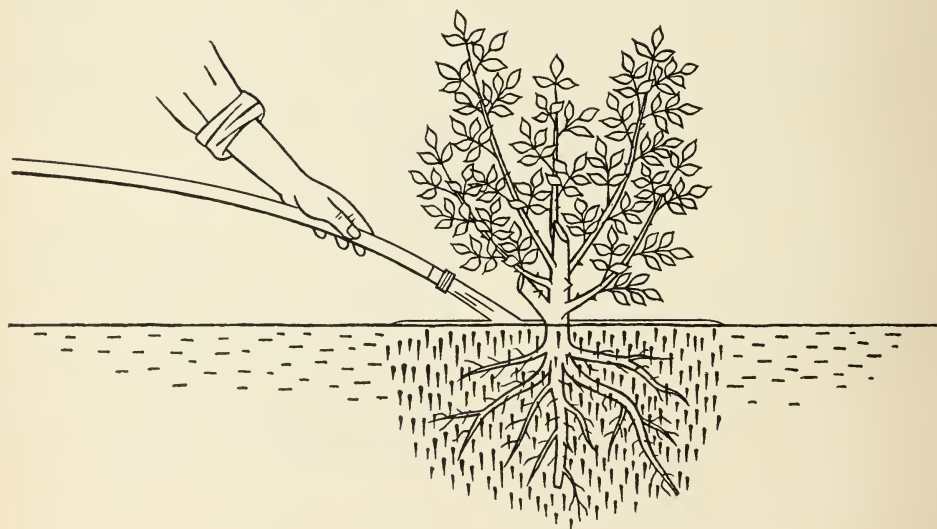
IRRIGATING

Roses need a moderate amount of soil moisture throughout their root zone to make good growth. They cannot grow into a dry soil. Watering too often or too lightly favors a shallow root system.

Until the bush is well established, leave a basin around the plant for irrigation. If the soil takes water readily the bush will not need the basin for irrigation, but if the soil is heavy, the basin must be permanent.

Depth of irrigation. When irrigation is necessary, the water should be run long enough to wet down to the full extent of the root zone. This will probably be at least 2 feet. Then no water should be added until the roots have had time to use up most of the available moisture. The soil moisture should vary between the point of full capacity and the point where the leaves begin to wilt. If the soil is not wet down to full root depth at irrigation, it might just as well not be wet at all.

A cubic inch of water in sandy soils should wet directly downward about 12 inches; in loams, 6 to 10 inches; in clay



soils, 4 to 5 inches. To wet the soil down 2 feet in an area 10 x 10 feet will require about 125 gallons in sandy soils, 190 gallons in loam soils, and about 330 gallons in clay soils.

Frequency of irrigation. How often to irrigate needs to be known. Since sandy soils do not retain any large amount of available water very long, they must be irrigated more often, perhaps once every 4 to 10 days. Loam soils retain more moisture than sandy soils; therefore, they may need to be irrigated once every 8 to 15 days in summer. Clay soils of large water-holding capacity may need to be irrigated only every 15 to 30 days.

Weather is also a guide for irrigation. During hot spells it may be necessary to water weekly or twice a week in sandy soils, especially shallow-rooted plants.

Type of irrigation. In planning for irrigation, it is necessary to decide whether to run the water in furrows or in basins, or to apply it by overhead sprinklers. Furrow irrigation is often the most economical method if the land is reasonably level. If the ground is very sloping, the furrows should probably run at right angles to the slope. A moderate drop of 4 to 6 inches in 100 feet is suggested for clay or loam soils, and about 10 to 12 inches in 100 feet for sandy soils. It is sometimes best to make the basin around each rose bush permanent, then at irrigation fill it so that the water will wet down to at least 2 feet.

Overhead sprinkling should be done early enough in the day for the foliage to dry off quickly. In order that the water from the sprinklers may penetrate the soil to a uniform depth, the sprinkler heads should be set to overlap each other by one half the diameter of the circle covered by the sprinkler.

TILLAGE

Tillage makes a rose garden look well cared for, but it does not conserve soil moisture. The ground around the rose

bushes should be properly mulched, and the bushes adequately watered, but insofar as the rose plants are concerned tillage is not necessary except to control weeds.

Weeds may also be controlled by sprays. These include light oils, which are very effective on most young weeds. Diesel oil, fortified diesel oil, stove oil, and various similar weed killers are being used. Some of these are sold under trade names, such as Standard Weedkiller No. 1 and Shell Weedkiller No. 10.

FERTILIZING

The best roses are grown where soil fertility is maintained at a relatively high level. Roses require a great amount of all the essential plant foods—nitrogen, phosphoric acid, and potash. A deficiency in any one will affect the growth of the plant as a whole.

California soil tendencies. In general, soils tend to become deficient in nitrogen first, although some may show a slight deficiency in phosphorus. Most California soils are quite high in potash, although occasionally a soil becomes deficient. Therefore, fertilizers are applied primarily to overcome these deficiencies.

While some soils have deficiencies other soils contain too much alkali, and occasionally too much lime, which interferes with the availability of iron. This brings about a condition known as lime-induced chlorosis. The presence of chlorotic leaves—or leaves that are yellowing—from soils known to have a high lime content might indicate this trouble. If too much lime is the cause, however, other kinds of plants nearby will also be likely to develop yellowing leaves.

Deficiency symptoms. The grower must not guess at the cause of chlorotic leaves. Certain virus diseases attacking roses may also affect the green color of the leaves—although where a virus is present, the leaves may become yellow only in spots. Each deficiency produces certain symptoms that can be identified,

Nitrogen deficiency will result in a yellowing of the leaves and the development of smaller flowers of light color.

Phosphorus deficiency may cause the older leaves to drop without turning yellow; the stems may be weakened and the bud development slowed by a smaller root system.

Iron deficiency first shows as a light yellowing in the tips of the leaves. In time the area between the veins may become very yellow, while the veins remain dark green.

Manganese deficiency causes a loss of green color similar to iron deficiency, but even the smallest veins remain green. Damage is most pronounced in the top of the plant.

Bull nose as a symptom. Occasionally the flower buds on roses fail to lengthen properly and remain stubby. These are sometimes called "bull nose" or "bull head." The exact cause has not been fully determined, but it is believed to be related in some way to a nutritional unbalance occurring when the stock used is too vigorous for the rose bush. A similar deformity may develop when the bush is overstimulated with a nitrogen fertilizer. This is especially likely to happen early in the year.

When some varieties are budded on stocks of vigorous old bushes of multi-flora, they also may develop bull nose. If tests show that the trouble is nutritional unbalance, either from use of too vigorous a stock for the top or by overstimulation with a nitrogen fertilizer, the fault may be avoided in the future by a better selection of understock and by correcting the method of fertilizing.

Excess of alkali. Where alkali salts are present in the soil in excessive amounts, the first step is to wash out the soluble sodium or potassium and chlorine by heavy irrigation. The addition of sulfur at the rate of about 1 pound to 40 square feet will help make these alkali salts more soluble. Better drainage is usually required in reclaiming alkali

soils. Roses grown on Ragged Robin root seem to be the most resistant to an alkaline condition of the soil.

Other mineral elements may occasionally be lacking or possibly be present in excessive amounts. For instance, too much chlorine or too much salt in irrigation water will cause trouble.

Use of barnyard manure. In most California gardens, virgin soils are sufficiently fertile; they require very little fertilizer. Gardeners have found that the application of 1 to 2 inches of barnyard manure in the late fall or early spring will keep the bushes in good health, capable of producing the highest quality roses. This organic matter will, in time, react with the soil to help make the fertilizer elements already in the soil available to the plant. At the same time it will supply some plant food, although manure is usually a more expensive source of nitrogen than commercial nitrogen fertilizer.

Use of commercial fertilizer. Some growers may wish to apply a mixed fertilizer instead of manure. To keep roses in good growing condition, a fertilizer containing 6 per cent nitrogen, 10 per cent phosphoric acid, and 4 per cent potash should be sufficient.

Mixtures with a somewhat higher content of nitrogen may be more economical when purchased in quantity. The potash is essential only if the soil is known to be deficient in it.

Applying fertilizer. Both barnyard manure and commercial fertilizer must be carefully applied. Properly aged barnyard manure should be dug into the soil around the bush once or twice during the blooming season. It is applied at a depth of approximately 2 inches each time it is used. Commercial fertilizer, which is much stronger than barnyard manure, is applied in a circle, some 8 inches out from the trunk of the plant. It must be carefully mixed into the soil. A full watering should follow application of either type of fertilizer.

PROPAGATION . . .

The home method is on self-roots; the commercial method is by budding on carefully selected rootstocks.

HOME METHOD

The home gardener often wants to root cuttings of some of his best roses. This can be done on self-roots if cuttings can be rooted successfully under local conditions. December is a good time to begin. This is well in advance of the pushing out of new growth and will give the home gardener a chance to callus and root the cuttings before top growth starts. After new growth shows, it is almost impossible to root a cutting successfully in the home garden.

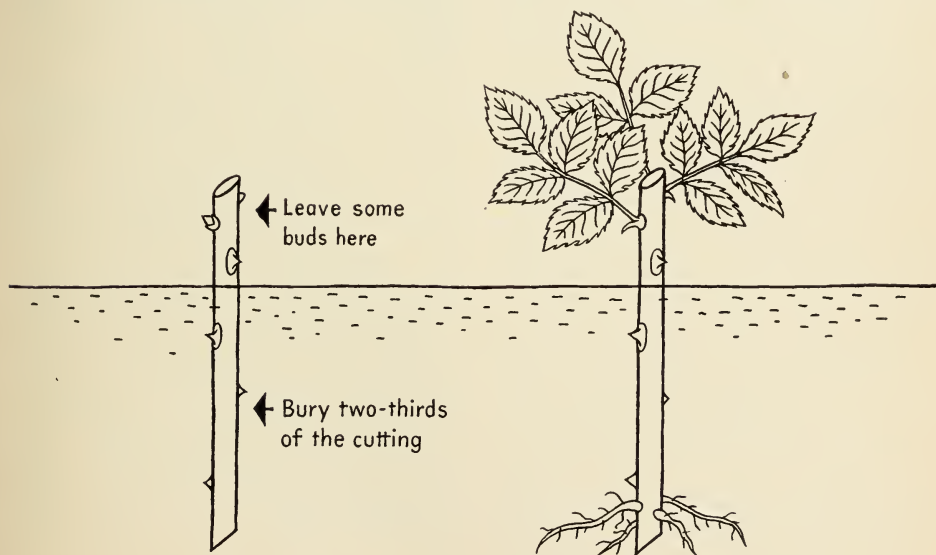
How to root cuttings. The cuttings, which should be cut just below a bud, should be callused in sand for rooting, or they should be inserted to at least two thirds of their length in well-drained soil in the garden. If this is done in December, with the cuttings inserted in moist, well-drained soil, no further attention is needed except proper irrigation and spraying for pest control. Leave at least one or two buds exposed at the top of

the cutting. Under favorable conditions the cuttings will callus and root as shown in the photograph below. It is best to leave these cuttings undisturbed the first growing season, then set the best rooted ones in the permanent location about January of the following year.

The home gardener is not concerned so much about scarcity of propagating stock. He may wish to start with cuttings taken from good varieties that root easily. A few roses, however, will not root easily from cuttings, so these will need to be budded. Rooted cuttings of home-grown roses should be transplanted to the permanent location at the end of the first growing season.

COMMERCIAL METHOD

Commercially grown roses are nearly always budded so that budwood, which is scarce, will produce the maximum number of plants. In this way a suitable rootstock can be selected for easy trans-



Two buds have been left exposed at the top of the cutting; the cutting has callused and rooted satisfactorily.

planting. The nurseryman plans to do the work of budding over a period of several weeks and selects his understock accordingly. Ragged Robin and Dr. Huey (Shafter strain) are two very popular rootstocks in California. Buds inserted in August will remain dormant until the beginning of the next growing season.

Requirements of rootstocks. The method used by a nurseryman to propagate roses is very different from that used by the home gardener, but the latter may want to know how the nurseryman judges the suitability of a rootstock.

Certain points are considered very carefully: 1) resistance to drought and summer heat; 2) length of life of the plant budded on it; 3) tendency to sucker; 4) resistance to root-knot nematodes; 5) season during which it can be budded successfully; 6) continuity of growth and ease of budding; 7) distribution of fibrous roots and condition of roots for transplanting; and 8) resistance to cold. These eight points are followed with little deviation in practically all commercial nurseries.

Rootstock varieties used. These include Ragged Robin, *Rosa odorata*, *R. rugosa*, manetti (*R. noisettiana*, formerly *R. manetti*, or *R. chinensis* var. *manetti*), *R. multiflora* or its hybrids.

Ragged Robin is one of the rootstocks that satisfactorily meet the eight points required for nursery propagation. It resists drought and summer heat better than most rootstocks. Plants budded on Ragged Robin may live longer than those budded on *R. multiflora* or manetti. Suckers rarely appear when the eyes of the cuttings have been properly removed. The rootstock is more resistant to nematodes than *R. multiflora*, manetti, or *R. odorata*. The stock remains in good condition for budding over a longer season than does *R. multiflora* or manetti; and its steady growth makes budding possible at almost any height. From the nurseryman's viewpoint, Ragged Robin is a fine stock, with a good distribution of

straight feeder roots. Roses propagated on this rootstock usually are reasonably resistant to cold, certainly more so than roses propagated on *R. odorata*.

Dr. Huey is a variety now often used as an understock in rose nurseries. The strain has proved to be very fine as a rootstock. Some rose growers use about 60 to 70 per cent of this rootstock and the rest of Ragged Robin. This is done mainly to increase the period for budding. Dr. Huey grows so rapidly that it cannot be budded much later than August 1. On the other hand, Ragged Robin can be used for later budding, although it does not seem to give such a strong root system as Dr. Huey.

IXL, a seedling of Veilchenblau, is often used to form the trunk of standard or tree roses. Since this particular variety does not have a good fibrous root system, it is not very satisfactory as a rootstock.

Method of propagation. The actual method of propagating most often used in the nursery is to callus the cuttings, then line them out in rows to root for budding to the desired variety later in the year. Budding is done because the budwood of new varieties goes much farther than cuttings. Budding also avoids the difficulty of transplanting some rootstocks.

When roses are budded in June on vigorous new growth, it is possible to force out buds the same season. But when budding is done late in the year, bud growth does not have time to get very long before the dormant season sets in. Many nurserymen prefer to insert the buds in August or even in early September. By budding this late the buds will unite and remain dormant until the beginning of the next growing season. Since the so-called dormant buds have a full season in which to grow, they are generally preferred to the June buds. One to two years from the time they are budded, rose plants are usually old enough to sell. They are classified according to three grades (see page 30).

INSECTS AND DISEASES . . .

Many insects attack roses in California, but effective methods can control most of these. Few diseases are serious enough in the state to need special treatment.

INSECTS

Aphids or plant lice. Two kinds of aphids are common pests on roses. One is the rose aphid, *Macrosiphum rosae*, which is a large green or pink species infesting the growing tips and buds. The other is the small green rose aphid, *Myzaphis rosarum*. This insect works on all parts of the plant, particularly on the underside of the leaves. There it produces quantities of honeydew on which grows a black, sooty, mold fungus.



The rose aphid is a large green or pink insect that infests the growing tips and buds of a plant. It often congregates in large numbers.

Aphids are fairly easily killed with a No. 5 nicotine dust (about 2 per cent nicotine) or a No. 10 nicotine sulfate dust (contains about 4 per cent nicotine) applied generously on warm days—approximately 70° F. Or they may be controlled with an application of 40 per cent nicotine sulfate, such as Black Leaf 40, used at the rate of 1 part to 800 parts of water—or about 1 level teaspoon per gallon of water. The addition of about 2 tablespoons of powdered soap increases its efficiency. This spray is applied directly to the insects in a fine mist from any good hand sprayer.

Early in the season, before the roses are in bloom, these aphids may be washed off with the hose every two or three days. This is best done early enough in the day for the foliage to dry off quickly. Pyrethrum oil sprays intended for plant use, applied as a mist spray to cover the insects, are effective against aphids. Pyrethrum dusts containing 0.1 to 0.2 per cent pyrethrins are also effective against aphids. Rotenone sprays are also used.

Borers. Certain borers, such as the flat-headed apple tree borer, may infest badly sunburned rose bushes. The bush may start to die back in spite of good soil and watering. Borers may be found within the injured parts. These pests are not serious if the bushes are properly cared for after planting. The raspberry horntail is also a borer that causes infested green tips to wilt. This is discussed in the following paragraph.

Raspberry horntail. The insect *Hartigia cressoni* attacks the growing tips on climbing roses in some of the warm interior valleys, but it is rarely serious. The wilted tips containing the larvae of the raspberry horntail should be cut off and burned to prevent further injury. All



The raspberry horntail in larva and in adult female and male forms. (About three times natural size.) (From Extension Circular 87.)

badly infested host plants should be dug up and entirely destroyed before new growth starts in the spring. No spray is effective in control.

Red spider mite or two-spotted spider mite. The two-spotted mite, *Tetranychus bimaculatus* Harvey, may cause a considerable amount of damage to the foliage of roses under greenhouse conditions, and to those in the open garden during the summer months. Spider mites can be seen only with the aid of a magnifying glass. A yellowing of the leaves in spots may suggest spider mite injury.

Frequent hosing off of the leaves will control most of the red spider mites. Dusting with sulfur alone is also effective, but the sulfur will leave an objectionable residue. Danger from sulfur burn can be avoided somewhat by applying the sulfur two or three weeks before an oil spray is applied and by avoiding weather conditions that increase leaf injury where sulfur is present. Aramite is one of the newer spray materials effective for controlling the two-spotted mite. Eliminate as far as possible other host plants harboring these mites.

Rose beetle (Fuller) or weevil. The Fuller rose beetle, *Pantomorus godmani*, is a gray, wingless beetle, about $\frac{3}{8}$ inch long. It eats around the leaf edges of

roses and certain other plants. It may be effectively controlled with the same stomach poisons used for the rose slug, or the entire rose plant may be dusted with cryolite dust.

The rose beetle can be restrained from crawling up the canes of the rose bush by tying cotton snugly around the stem as a barrier. This is practical, however, only where a very few rose canes are growing, as on some climbing roses. The rose beetle is not abundant in most gardens.

Rose scale. The rose scale, *Aulacaspis rosae*, often thickly infests older canes. Its presence is indicated by white, flattened, armored scale insects on the older rose canes. It can usually be controlled effectively by cutting out all of the older canes without leaving any stub, and by properly pruning any bush berries nearby that may also be infested with the scale. A winter-strength oil spray may be safely applied where necessary.

Rose slug. The bristly rose slug, *Cladius isomerus*, infests roses more frequently in the San Francisco Bay area than in any other section of California. It is a yellowish-green, bristly, wormlike insect that eats holes from the underside of the leaves from about May on, as long as green leaves appear. The adult, which resembles a small wasp, lays its eggs on the underside of the petioles, and the in-

sects may continue to appear from May on through the summer until early fall.

Where the rose slug is troublesome, the rose leaves should be sprayed two or three times during the season, starting about the first of May. Lead arsenate, used at the rate of $\frac{1}{2}$ ounce, or 3 level tablespoons, to the gallon of water is effective, but leaves a gray residue on the foliage. This residue is less objectionable if the first application is delayed until most of the first crop of roses has been harvested.

Liquid rotenone sprays have also been used to control the rose slug. These do not leave an objectionable residue. They are applied at about the same concentration as 40 per cent nicotine sulfate, or a teaspoon to a gallon of water. However, directions on the package should be followed. Spray first about May, or about the time the rose slugs begin to eat the leaves.

Various trade products are also available for the control of this and of similar chewing insects. A second application will usually be needed in early July to protect the leaves that have come out since spring.

Rose snout beetle or rose curculio.

The small red and black rose beetle, *Rhynchites bicolor*, about $\frac{1}{4}$ inch long, may begin to puncture holes in the stems or buds starting to develop in the early part of summer. The sprays used to control the rose slug will help control the snout beetle. A 5 per cent nicotine dust has also been helpful. An application of lead arsenate will protect the leaves covered, but nicotine sulfate has to be applied directly on the insects. Hand-picking or jarring the beetles into a pan of oil may be adequate where only a few are present.

Thrips. The flower or grass thrips, *Frankliniella moultoni*, sometimes appears on unfolding rose buds. It may increase blasting, a condition discussed under diseases. The rotenone sprays sometimes used to control rose slugs are



The yellowish-green, bristly, wormlike rose slug made the holes in these leaves.



The small red and black rose snout beetle or rose curculio punctured the holes in these stems and buds. (From Essig, *Insects of Western North America*. Courtesy The Macmillan Company.)

also effective against flower thrips. The pyrethrum-oil sprays are as highly effective against this pest as against aphids. Some of the trade products on the market containing both pyrethrum and rotenone should prove satisfactory. Wettable DDT dust may be applied occasionally, allowing 1 pound actual DDT to 100 gallons of water (about 3 level tablespoons to 3 gallons of water). An application once every 10 days or 2 weeks during the early growing season should be adequate. The underside of the leaves should be completely wetted at each application.

Other insects. Certain other insects, such as the leafhopper, may occasionally cause damage, but they are of minor importance. The rose leafhopper, *Typhocuba rosae*, is reported to have caused some damage in the San Joaquin Valley. In the San Francisco Bay area, the blue sharpshooter, *Cicadella circellata*, is often found on rose leaves, but does not seem to cause much damage. A 5 per cent nicotine dust is effective on the young nymphs. DDT sprays are also useful in control. A 50 per cent wettable DDT powder used at the rate of 1 ounce, or 3 tablespoons of powder, to about 3 gallons of water may be sprayed on the foliage, beginning in May and repeated about once a month for two or three months. Shake this mixture well from time to time to keep the DDT powder in suspension. (See "The Combined Spray Program," page 22.)

DISEASES

A number of diseases attack roses, yet only a few are really serious enough in California to need careful treatment. However, the various diseases will be described in the hope that the grower will understand the nature of the trouble, and will take whatever control measures are necessary.

Anthracnose. This is caused by the fungus *Sphaceloma rosarum*. It appears on the leaves as small, circular, light-colored spots bordered with black. Dis-



Black spot shows in irregular, dark-brown or black spots which increase in size until most of the leaf surface is affected. It usually causes premature leaf drop.

eased leaves drop prematurely. This and other fungus troubles may be controlled by the usual copper or sulfur sprays.

Black spot. This disease, which is found occasionally but which is rarely serious in the moist coastal area of California, is caused by the fungus *Diplocarpon rosae*. Irregular, dark-brown or black spots with a fibrillose margin appear on the upper side of the leaves. These spots increase in size until most of the leaf surface is affected. The remaining part of the leaf usually turns yellow, and the leaf then falls. This disease can be controlled with Fermate.

Bud blast or blight. This disease is especially common on rose plants which have been neglected. Certain varieties may also be unusually susceptible. The outer petals turn brown and die, and thus prevent the flowers from expanding. A gray mold, *Botrytis cinerea*, may attack the flower tissues; the unopened flower will then drop off. Rose mildew and

flower thrips may cause this trouble to increase.

Bull nose or bull head. This is probably not caused by any organism, but may be a functional disorder (page 14).

Canker, cane blight, and dieback.

There are three kinds of canker: plant canker, caused by *Coniothyrium Wernsdorffiae*; stem canker, by *C. Fuckelii*; and brown canker, by *Diaporthe umbrina*. Dead areas appear on the canes, especially around wounds made in pruning or where flowers have been cut. While this trouble is not very common in most parts of California, occasionally it may result in considerable damage on such varieties as Golden Emblem. If pruning is delayed until new growth pushes out, and if wounds are covered with a suitable wound dressing, such cankers can be controlled fairly well.

Chlorosis. California soils occasionally contain an excessive amount of lime—ranging as high as 5 to 20 per cent. When lime reacts with iron in the soil, it makes the iron less available for plant use. As a result, the tissues between the veins of the leaves lose much of their green color, and growth may be somewhat slowed.

Iron sulfate may be applied to the soil at the rate of 1 to 4 ounces for each square foot—depending on how much lime is present—to help insure an adequate amount of available iron. Iron sprays are also available. If the loss of green color is due to a deficiency of manganese, then manganese sulfate may be sprayed on the foliage to help improve the green color.

Crown gall. This disease, caused by *Agrobacterium tumefaciens*, is characterized by the appearance of rough galls or swellings on the roots or on the crown of the rose bush. It usually appears where the tissues have been injured in cultivating. This same bacterial disease attacks bush berries, almonds, peaches, and other related plants; it may spread rapidly under favorable conditions.

A product known as Elgetol has been used successfully to destroy the galls on peaches and almonds. This product is painted on the galls. It is hoped that such treatment will be effective when applied to the young galls on roses. (ELGETOL IS POISONOUS TO HUMANS AND ANIMALS AND MUST BE USED WITH GREAT CAUTION.) The rose bushes should be examined carefully at the time of planting. Any galls present should be removed, and all cut surfaces and pruning tools should be disinfected with corrosive sublimate, diluted at the rate of 1 part to 1,000 parts of water, or 1 standard tablet to a gallon of water for a strength of 1 to 1,000. (CORROSIVE SUBLIMATE IS VERY POISONOUS TO HUMANS AND ANIMALS, AND SHOULD BE HANDLED WITH GREAT CAUTION.)

Mildew. Two kinds of mildew may attack roses—powdery mildew and downy mildew.

Powdery mildew is caused by the fungus *Sphaerotheca pannosa*. This form is the one of greatest interest to rose fanciers. Powdery mildew is found in practically every part of California. This is especially true near the coast where moist, foggy conditions prevail. It attacks the young leaves, buds, and shoots of susceptible varieties, usually distorting their growth. Powdery mildew requires repeated spraying with a copper or sulfur fungicide throughout the early growing season.

The copper and sulfur sprays will usually control both kinds of mildew. Summer strength liquid lime-sulfur, ammoniacal copper carbonate, and similar mildew sprays are effective. A scant pint of lime-sulfur to the gallon of water makes a good winter spray. After the leaves appear, reduce the amount to about 1½ tablespoons of lime-sulfur solution to a gallon of water (see "The Combined Spray Programs," page 22).

Among the more promising mildew sprays may be included a product known as Rix. This liquid sulfur preparation

similar to lime-sulfur solution has proved very helpful in controlling rose mildew and similar fungus troubles. Triogen is another effective mildew spray. Both of these sprays darken white lead paint, so keep them from spattering painted surfaces if possible. Apply the spray about once every week or 10 days as long as mildew threatens. Such sprays are applied to prevent, not to cure, rose mildew.

One of the wettable colloidal sulfur sprays giving good control is Naugatuck Sulfur. It has helped control mildew on the most susceptible varieties near the coast.

Downy mildew is caused by the fungus *Peronospora sparsa*. It appears as

irregular brown spots on the underside of the young leaves; badly blighted leaves will fall. Downy mildew has been reported only where conditions are very humid, as in some greenhouses.

Much progress has been made in recent years in breeding roses for resistance to mildew and other diseases. Many of the newer roses are highly resistant to mildew, sometimes practically free from it. This is particularly true where the foliage remains reasonably dry during early development of the disease.

A few popular varieties known to be disease resistant are: Applause, Captain Thomas, Charlotte Armstrong, Debonair, Duchess of Athol, Etoile de Hollande,

THE COMBINED

This program controls the more common pests and diseases on roses; for example, an insecticide for control of the rose aphid and a fungicide for control of rose mildew.

SPRAY COMBINATIONS

Many gardeners with only a few rose plants will prefer to buy trade products to apply as a combined spray. Most of these sprays are effective because they contain copper or sulfur. They may include a pyrethrum-rotenone-oil combination for insects, to be used along with a copper spray of some kind for the control of mildew. DDT may be present along with sulfur in some combined sprays. Sulfur and oil cannot be used together safely, but pyrethrum oil sprays are quite satisfactory. Triogen, Rix, and similar trade products are intended to control more than one trouble. When using trade products, follow recommendations given by the manufacturer for safe mixture or combinations.

Weekly applications of a spray containing $\frac{1}{2}$ part by weight of liquid lime-sulfur, $\frac{1}{5}$ part of Fermate, and $\frac{1}{10}$ part

of Triton B1956 or other good spreader, in 100 parts by weight of water should help control rust and black spot.

Soap should not be used with pyrethrum, lead arsenate, cryolite, various copper sprays, or with lime-sulfur. Lime-sulfur should not be used with standard lead arsenate or with bordeaux mixture.

Where only one trouble appears at a time, use any one of the effective control measures, such as 40 per cent nicotine sulfate for the control of rose aphids, or any good mildew spray for the control of rose mildew. But in most gardens it will be desirable to combine an insecticide with a fungicide for the control of both rose mildew and aphids, in the early part of the growing season. Should the rose slug appear along in May, include in the combined spray a stomach poison as well as a contact insecticide. The combined spray program should usually start about the first of May, continuing every one to

Fantasia, Golden Rapture, High Noon, Katherine T. Marshall, Ma Perkins, Mme. Henri Guillot, and Ville de Paris. The bush form of Cecile Brunner is one of the popular polyantha roses known to be resistant to mildew.

Such climbers as Mermaid are comparatively free from disease. Usually the climbing forms of resistant bush roses are also disease resistant, although sometimes they are somewhat more susceptible because of the tender, vigorous growth. For instance, the succulent tips of the climbing Cecile Brunner may be attacked by mildew in a cool, moist climate.

Exposure, climate, and variety all affect freedom from disease. Where a vari-

ety is known to be susceptible, try to plant it where the foliage will remain as dry as possible, and spray regularly for mildew control. Encourage a moderate growth rather than a rank, succulent growth on such susceptible varieties. In the cool coastal districts where mildew is most severe, it may be best to avoid susceptible varieties.

Mosaic. Trouble from this virus appears in several forms, often causing a blotchy yellow appearance on the leaflets. Since the disease may be carried from the rootstocks to the budded part of the plant, start only with healthy rootstocks—which most nurserymen try to use. There is no cure for rose mosaic, so

SPRAY PROGRAM

two weeks, or as long as new growth appears.

One simple combined spray formula for summer use consists of:

- 1½ tablespoons of lime-sulfur solution
- 1 tablespoon of Dreft
- 2 scant teaspoons of Black Leaf 40
- 1 gallon of water

Reduce the amount of lime-sulfur if the foliage shows any indication of injury.

USE OF SPRAYS AND DUSTS

Spraying. The selection of the spray material will depend upon the type of sprayer used. A sprayer with a bordeaux nozzle will accommodate regular winter strength bordeaux mixture, lead arsenate, and various other spray materials which would clog the atomizer type of sprayer. Since most rose fanciers prefer spray materials which do not leave a noticeable residue, selection must therefore be made from a limited number of fungicides in the combined spray.

After growth starts, apply summer strength lime-sulfur at the rate of 1 gallon to 100 gallons of water. Add to this 5 pounds of wettable sulfur and 1 pint of

40 per cent nicotine sulfate solution, such as Black Leaf 40. This is at the rate of 1½ ounces of wettable sulfur, and 1 teaspoon of nicotine sulfate for each gallon of water. A small amount of a summer oil spray may be added as a spreader or sticker. In terms of volume, allow about 1½ tablespoons of lime-sulfur solution per gallon of water after the rose leaves are out.

Many trade products on the market contain copper in some form. These may be used with fairly good control of most kinds of fungus diseases, if applied at intervals of 10 days or 2 weeks. Nicotine sulfate or rotenone may be added to control rose slugs.

Dusting. Dusting with sulfur is objectionable because it leaves a noticeable residue. The same objection holds in the use of powdered lead arsenate. On the other hand, rotenone will serve both as a contact spray and as a stomach poison for the control of aphids or rose slugs.

Vaporizing sulfur. Under greenhouse conditions, sulfur may be vaporized if placed on the steam pipes or over a low, steady heat on an oil stove, but it should never be allowed to burn.



Mosaic may be carried from the rootstock to the budded part of the plant.

any plant found to be affected with this virus disease should promptly be discarded to avoid possible spread to healthy plants.

Oak fungus. This disease is caused by the fungus *Armillaria mellea*, and may be present in certain California soils. Oak fungus usually attacks the tissues below the surface of the ground, where it causes dead areas to appear in the bark. Ultimately, a white, fan-shaped fungus forms between the dead bark and the wood. It is impractical to try to cut out the diseased portions of the rose bush. Furthermore, there is a strong probability that the oak fungus in the soil will attack new rose bushes which are used to replace the diseased plants.

Where oak fungus prevails in the soil, the gardener should consider planting certain resistant ornamentals. A list of ornamentals known to be resistant may be secured from the Public Service Office, Agricultural Extension Service, University of California, Berkeley 4.

Rose rust. In many instances, the first stage of rust is indicated by a mottled condition of the upper leaf. In its advanced stage, it produces bright orange pustules on the underside of the leaves. Islands of green tissue remain in the areas where the spores form. The rest of the leaf becomes yellowed or chlorotic.

Rust is caused by the fungus *Phragmidium mucronatum*. Some varieties of

roses are more susceptible to the disease than others. Planting a susceptible variety near one badly attacked by rust will surely lead to spread of the disease. Complete defoliation at the time of winter pruning is necessary to prevent a carry-over of both rust and mildew from one crop of leaves to the next. Many rose fanciers have had trouble when they were careless about these details.

The measures used to control mildew, including lime-sulfur solution, will also help prevent rose rust, but most fungicides will not completely control this disease.

A promising control for rose rust reported by rose fanciers is a combination of equal parts of wettable sulfur and Fermate. After mixing the two in equal parts, place 3 level tablespoons of the dry mixture in a quart jar and add enough water to produce a creamy mixture; then strain it through a fine tea strainer into the spray tank. Add $\frac{1}{2}$ teaspoon of a good spreader or sticker, and, finally, enough water to make 1 gallon of spray. Usually 40 per cent nicotine sulfate, such as Black Leaf 40, is added at the rate of 1 teaspoon to a gallon. Liquid lime-sulfur may be substituted for wettable sulfur, as mentioned in the combined spray program (see page 22). Fermate darkens white lead paint, so keep this spray away from painted surfaces.

Where chewing insects, such as the rose slug, are also causing trouble, they may be controlled by adding about 1 teaspoon of wettable DDT powder to each gallon of spray about once every six weeks. The DDT should not be included in each spray application because it may favor an increase in aphids.

It is true that the measures used to control mildew, including lime-sulfur solution or liquid sulfur sprays, will also help to prevent rose rust, but most fungicides are not a complete control. On the other hand, the Fermate treatment, which is so effective for control of rose rust, is not adequate for control of rose mildew.

PRUNING . . .

This improves the quality of the blooms, regulates the size and shape of the plant, and removes diseased or damaged parts.

WHEN TO PRUNE

If pruning is properly done it strengthens the plant. If improperly done, it can be highly destructive. The method of pruning will naturally differ with habit of growth. Since roses are usually classified according to habit of growth, it is easy for the grower to determine what method of pruning to use. Pruning at planting is discussed on page 11.

Varieties with tall or upright growth include Autumn, Buccaneer, Condesa de Santiago, Duquesa de Penaranda, Floradora, Forty-Niner, Golden Rapture, Horace McFarland, Katherine T. Marshall, Ondine, Pink Bountiful, Poinsettia, President Herbert Hoover, Rubaiyat, San Fernando, Show Girl, Sonata, Sutter's Gold, Talisman, Texas Centennial, Victoria Harrington, and White Wings.

These varieties may need to be pruned to outside buds to make the plants more spreading. Other varieties, such as Crimson Glory, Debonair, Lucia Zuloaga, and Mrs. Sam McGredy are spreading in growth and may need to be pruned to inside buds to make the plants more upright. Since most varieties are only moderately upright, special pruning will probably not be required to improve the shape of the plant.

Winter pruning. Pruning should be done at least once a year on all roses. The present practice with most varieties is to prune very late in the dormant season. In many instances it is done late in January rather than in December. This allows a minimum amount of time between pruning and the pushing out of new growth. More dieback has been experi-

PRUNING FOR A PURPOSE



Two climbing Mrs. Sam McGredy roses were pruned and trained to arch the front of this garage.

enced on some varieties of roses when pruning is done early than when done late. Pruning in late January should encourage the pruning cuts to heal promptly with less danger of infection. Further protection against any trouble on susceptible varieties is given by covering the larger wounds with a good wound dressing.

Summer pruning. This involves cutting back vigorous new growth in general. Such pruning tends to be weakening. It should therefore be largely limited to extremely vigorous varieties, such as the Belle of Portugal, and to vigorous hybrid tea varieties that need length growth limited.

The pillar roses also need some pruning in the summer months for good shape when they are in flower. The totem-pole rose or roses that have the canes woven about some form will need to be trained during the summer months, and perhaps shortened-in occasionally to give the desired shape. Summer pruning should therefore be limited largely to maintaining shape.

Second pruning. Sometimes there is a question of how much pruning to do after each crop of blooms is over. When the flowers fade, they will need to be picked off or cut off. It is also good practice to shorten-in the new growth, cutting back to strong side buds or laterals. The uppermost buds will form new shoots which, in hybrid tea roses and in certain other everblooming roses, will flower in time. When the second crop of flowers has finished the blooming period, the growth may again be shortened-in by cutting back to strong side buds or laterals.

By this system, three crops of flowers a year can be produced under favorable conditions. When the regular dormant season arrives, the different flushes of growth made during the year are usually ignored. The total annual growth is rather severely cut back to a good side bud low down on the current season's

growth, with only one to three buds left on the growth made for the year. Occasionally more buds may be left on very vigorous roses or on such roses as Golden Emblem, which seems to flower better when the canes are allowed to grow a little longer than usual—in fact, Golden Emblem is a rose that should be pruned very little.

Type of pruning shears. One of the popular types is made from the Rieser pattern. The blades should always be clean and sharp.

Dressing pruning wounds. Wounds normally do not need to be covered. However, where a particular variety of rose tends to show dieback after pruning, the wounds probably should be covered with some good wound dressing. The cold asphalt materials on the market are satisfactory.

HOW TO PRUNE

When deciding on what parts of a rose bush to cut out, remember that the canes on most bushes can be expected to produce good flowers for perhaps four or five years and occasionally longer. When a cane reaches the limit of good flower production, cut it back right to the ground. In the meantime, a new cane should be developed to replace each old cane that is taken out. If the rose bush is properly handled, it will develop new canes for this purpose.

When a rose cane is cut back to a bud or occasionally to a lateral, the uppermost bud or upright lateral will normally make the greatest length growth. The cut is made within about $\frac{1}{4}$ inch of the bud—not farther out. You can make an upright rose bush more spreading by cutting back to outside buds or lateral branches. Or you can make a spreading rose bush more upright by cutting back to inside buds or upright laterals. In this way it is possible to regulate the shape of the bush.

Pruning the bush rose. There has always been disagreement about how much to cut back on a bush rose. A plant

from the nursery is pruned in still a different way from a plant already established. Some rose fanciers maintain a height of about 2 feet for many varieties of established hybrid tea bush roses. A few kinds, such as Autumn, President Herbert Hoover, Susan Louise, Texas Centennial, and Sutter's Gold are sufficiently vigorous and upright to support much longer cane growth and still produce many flowers with long stems. It is a mistake to prune back such varieties as severely as is often done on hybrid tea bush roses of moderate vigor.

Growing conditions affect the vigor of bush roses and, indirectly, the severity of pruning. Many of the roses grown in central California gardens respond to somewhat more severe pruning than do the same varieties grown in parts of southern California. To say that an established bush rose should be maintained at a height of about 18 inches, or 2 feet, or some other height is purely arbitrary. The height maintained is dependent on varietal characteristics and the conditions under which the bush is grown.

The growth and flowering over a period of five to ten years or longer should be considered when deciding on the best type of cane-pruning. We may class a new rose, such as Sutter's Gold, as very vigorous and upright; because of this, we may decide that the canes should be left somewhat longer than the less vigorous rose bushes. It may take a few years for the ordinary gardener to find out exactly how the variety responds to a certain type of pruning.

While some canes may start to decline after about five years, there are many exceptions. Autumn and similar vigorous, upright varieties may produce canes that continue to flower well after ten years. With moderate pruning each year such canes may reach a height of 3 to 4 feet. There will usually come a time, however, when the older canes will lose vigor; then they should be cut back with a pruning saw clear to the ground. A

moderate amount of thinning-out of very old canes each year will encourage a rose bush to continue to send up vigorous new growth from the base. If the old canes are left too long, and insufficient thinning is done, the rose bush may produce so little vigorous new growth that it is hardly worth keeping. Regardless of the amount of pruning, a bush should produce long, healthy canes year after year.

The amount of pruning should therefore be regulated to give these results. Sometimes a little heavier pruning will encourage longer new growth, whereas an unpruned rose bush will, in time, produce rather short growth.



The upright habit of Sutter's Gold suggests leaving the canes somewhat longer than on the more spreading varieties.

A reasonable amount of thinning-out of new growth is permissible to admit light and air to the remaining buds. But remember that pruning should be modified in accordance with the growth habit of the particular variety under local conditions and with the results desired. For example, a floribunda variety is grown for its masses of bloom while most hybrid teas are grown for quality buds or blooms borne on long stems. Less pruning will encourage more blooms, but the size of the flowers and length of stem may be poor.

Ground canes appearing above the bud union are the best wood on a rose bush and such vigorous new wood should be used to replace older canes. Remove as much of the older wood as possible without destroying the natural shape of the plant. In general, cut the new wood back about half way and to an outside bud or eye. Use a sharp knife in cutting the very soft wood to avoid ragged edges.

Roses that have been properly propagated should not produce suckers below the bud union but if, for any reason, suckers do appear, they must be promptly and completely removed. New canes normally develop above the bud union, and vigorous new canes usually push out immediately above the bud union. These vigorous new canes are the ones used to form the framework of the bush and to replace any old canes that must be removed.

Many of the polyantha roses, such as Cecile Brunner, are upright in habit of growth. They usually support more canes than most of the hybrid tea roses, and their canes are not generally shortened in so much as those on most hybrid teas. Vigorous canes on these upright varieties may develop a cluster of flowers. When this happens, the cane should be cut back to a sound bud just below the place where the cane has formed the cluster of roses. Cecile Brunner should be cut to outside buds to prevent the formation of too compact a growth.

Hybrid tea bush roses will usually respond best to rather severe to moderate pruning, although there are some exceptions. For example, a vigorous variety, such as Autumn, will probably produce excellent flowering wood when the canes are allowed to reach considerable height. A vigorous rose of this type may be allowed to produce longer canes as well as more canes. On the other hand, certain tea roses, such as Lady Hillingdon, which are weak in habit of growth cannot be expected to produce the best flowering wood unless they are pruned back rather severely. Such differences in natural vigor, as well as in local growing conditions should be considered when deciding how much to cut back, both at planting time and in later years.

Pruning the floribundas. Floribunda roses are variable in habit of growth, since they include both the large-flowering polyanthas and the low, compact-growing hybrid teas. This class must be pruned to encourage the mass color effect for which it is valued. Just enough thinning-out and cutting-back is required to encourage the production of healthy flowering wood each season. When planted along driveways and walks, where there is plenty of room, the floribundas can form fairly large bushes needing only a small amount of pruning in winter.

The floribundas may also be pruned a second time during the growing season to keep the long canes in bound. Some of the vigorous floribundas are pruned much the same as hybrid tea roses. Pinocchio, Cinnabar, Pink Bountiful, and Floradora are sufficiently vigorous to justify only moderate pruning.

Pruning the climbing rose. For those roses which bloom only in the spring, delay pruning until after flowering. A maximum number of flowers is thus secured. The climbing hybrid tea roses that have developed as sports from bush roses will usually flower over a long period of time. Such roses may be



The more vigorous floribunda roses, such as Pinocchio, are pruned much like the hybrid tea roses of moderate growth.

pruned moderately in the late dormant season. The side branches or laterals on the long canes should be cut back to stubs of from one to three buds. Most of the length growth of the main canes, however, should be left. Any new canes needed to replace aging ones should not be removed.

A climbing variety, such as Belle of Portugal, may also need a second pruning. However, these roses should not be pruned in the late dormant season before the plant has flowered. Among a few other climbing roses which will tolerate more than one pruning a year are Cecile Brunner and Mermaid. In fact, they will tolerate almost any kind of pruning, whether a rather heavy shortening-in of the length growth or a shortening-in of the side branches.

Pruning the standard rose. Most people who grow standard roses want a somewhat drooping habit of growth, or

fountain effect, which gives a rounded head and a satisfactory length of flower stem. They select their varieties with this ideal in mind. Occasionally, however, the standard rose may involve one of the upright varieties, such as President Hoover, which is very hard to manage in pruning. Table 5 calls attention in the footnote to varieties too upright to give the best shape for a standard rose plant. Some varieties, such as Debonair, Duchess of Athol, and The Chief, which are spreading in growth, make very good standard rose trees principally because of their curving stems.

Whatever pruning is required for standard roses should normally be given late in the dormant season. Pruning should be done each year, with only one to three buds of the past season's growth left on the varieties of moderate vigor. More cane growth is left on extremely vigorous standards.

GRADING AND APPRAISING TECHNIQUES . . .

Grading roses for sale is done according to three classifications; appraising roses for exhibit, according to definite techniques.

GRADING FOR SALE

Three rose grades. When roses are sold according to grade, they are listed under No. 1 (Large), No. 1½ (Medium), and No. 2 (Small). The amount of growth found in these grades will vary somewhat with the vigor of the variety. The more vigorous varieties will usually have three canes or, as in No. 1 grade, two 18-inch canes. In No. 1½ grade there should be two canes 14 inches long, and in No. 2 grade, one strong cane or two canes 10 inches long. The weaker varieties should have three canes in No. 1 grade or two canes about 15 inches long. Plants in No. 1½ grade should have two canes about 12 inches long, and those in No. 2 grade, one strong cane or two 10-inch canes.

Grading hybrid perpetual roses. These and other very vigorous roses will probably make a better length growth than the varieties just mentioned. Growers therefore can expect three canes of 20-inch length in No. 1 grade, or two canes of 12-inch length in No. 1½ grade. No. 2 grade should have one strong cane or two 10-inch canes.

Occasionally there are weak varieties within the hybrid perpetual and similar classes. When this is true, the canes may be only 16 inches long in No. 1 grade; 12 inches in No. 1½ grade; and 10 inches in No. 2 grade.

Grading polyanthas. The polyanthas are expected to have four canes 10 inches long in No. 1 grade; three canes of 8 inches in No. 1½ grade; and two canes of 6 inches in No. 2 grade.

Grading climbers. Most climbing roses are known for their vigor and length of growth. In No. 1 grade, most of the climbers should have three canes 24 inches long; in No. 1½ grade, two

canes 18 inches long; and in No. 2 grade, one strong cane or two 12-inch canes.

Grading other varieties. Certain other varieties of vigorous roses may produce extra canes. It is therefore reasonable to expect such varieties as Dorothy Perkins and Hiawatha to have four canes 24 inches long in No. 1 grade.

Sale containers. Bare-root plants are sold in the nurseries from December until new growth pushes out. After new growth appears, the nurseryman usually pots the unsold rose plants, often trimming back the roots to fit the plant into the container. An extra charge is made for this additional work. For planting in January and February, No. 1 bare-root plant has no superior. Later in the year you will probably have to buy roses planted in containers, even though such plants are rarely equal to No. 1 bare-root plants sold in January or early February.

Small rose plants are sold in cartons at certain stores. Such plants should prove satisfactory for their grade unless they are held too long. No. 1 grade is usually superior to No. 1½ or No. 2 grades when sold at the normal season. Gardeners should examine the plants at the time of purchase to see that they are in good condition.

APPRAISING EXHIBITION BLOOMS

Organizations aiding growers. The appraisal and selection of rose varieties have interested rose fanciers for many years. Various organizations have been formed to help growers.

The American Rose Society, with headquarters at Harrisburg, Pennsylvania, has been most helpful to members in the different parts of the country. Organizations in California, such as the Pacific Rose Society, with headquarters at La

Cañada, and some local organizations, are affiliated with the national organization, although members of the local organizations may elect to join the national organization.

Another helpful organization is the All America Rose Selections. This organization does a fine job of appraising the value of new rose introductions.

National appraisal versus local conditions. It should be remembered that any national appraisal must be correlated with local experience to be significant. Therefore, the mere fact that a rose has been given an All America Award does not necessarily indicate its value for a particular district in California, although rose varieties that are generally successful—especially on the Pacific Coast—stand a good chance of being successful in many California gardens.

For example, Mirandy won an All America Award in 1945, yet recognized rose fanciers in central California pronounce it almost worthless locally. It needs heat to do well. So, appraisals of a general nature must be adapted to local conditions and experience, and not based solely on some general appraisal, such as All America Awards choice, or even the high rating in a rose publication.

Judging for exhibition. Form or shape, color, substance, stem and foliage, and size are all considered in the judging of roses for exhibition. The allowances for these points are:

	Per cent
Form or shape	25
Color	25
Substance	20
Stem and foliage	20
Size	10

Note that no allowance is given for fragrance in exhibition roses. This is true despite the fact that many people who grow roses unconsciously prefer the varieties with fragrance (see table 8) to those without, even though the roses otherwise are equal in value.

If roses are to be exhibited, the stems must always be disbudded. The foliage should be free from mildew, rust, or other diseases, and should also be free from insects. A variety with healthy shiny foliage is always appreciated. The stem below the blooms should be properly covered with leaves. Certain roses, such as the President Herbert Hoover, cannot fulfill this requirement; their stems below the buds are not properly covered with leaves. Varieties that make healthy plants with a minimum of care can usually be rated higher for standard purposes than varieties that must be continually sprayed to control diseases or insect pests.

The number of petals is partly a varietal factor and may be affected by climate. Certainly the buyer should know whether the variety has many or few petals. Peace has 50 to 60 petals, Chrysler about 50, Fred Howard 50, and Mirandy 35 to 50. They are well adapted to moderately warm climates, and can be expected to have a good number of petals in spite of hot weather. Show Girl has 15 to 19 petals, and Sweet Sixteen has 16 to 18 petals. Sutter's Gold, with about 24 petals, is often too open in hot weather.

Many roses of recent years have had too few petals to make for ideal exhibition, but their color and other characteristics have often made up for this one deficiency. The form of the buds may be good in spite of this fault. Most roses are judged when only partly opened; therefore, good buds are important, even though the flowers are less desirable when fully blown. However, if form of the flower is of prime consideration, as in exhibiting, the grower perhaps should avoid such varieties as Fred Edmunds and Grande Duchesse Charlotte, whose forms are sometimes faulty. Similarly, too little foliage beneath the flower on varieties such as President Herbert Hoover makes them unsuitable for competition in a flower show.

Color classes listed are often too restricted to admit some bicolors and some

of the multicolored varieties. For example, Peace is not exactly yellow and does not fit well in a yellow color class. Forty-Niner is not limited to red. Color variations should therefore be given consideration when making up color classes for exhibition.

Single roses may be very charming. Their simple design always has appeal. However, if anything happens to one of the five petals the flower is not suitable for exhibition. In a double rose, on the other hand, a faulty petal will not be such a serious handicap.

**Table 1: ROSE PLANTS AND ROSES GROWN FOR CUT FLOWERS
IN CALIFORNIA***

Ornamental rose plants		
Establishments		178
Plants grown		9,895,938
Value		\$ 3,210,755
Plants grown under glass		
Establishments		9
Plants		18,982
Value		\$ 28,298
Lining-out stock		
Establishments		13
Number of plants		2,108,491
Value		\$ 66,090
Plants for growing on		
Establishments		5
Number of plants		28,850
Value		\$ 7,100
Roses grown for cut flowers		
Establishments		51
Number of flowers		54,367,636
Value		\$ 3,144,734

* United States Census, 1950.

**Table 2: SOME POPULAR SMALL ROSES ARRANGED ACCORDING TO
HABIT OF GROWTH**

Polyantha	Floribunda	Miniature
Cameo (shell pink) Cecile Brunner (pink) China Doll (pink) Kirsten Poulsen (red) Lafayette Improved (cherry; crimson; semidouble) Mrs. R. M. Finch (pink) Perle d'Or (yellow) Pinkie (pink or Neyron rose) Poulsen's Yellow (yellow) Sunshine (golden orange) White Finch (white)	Betty Prior (red) Bright Eyes (yellow) Chatter (crimson red) Cinnabar (red) Donald Prior (cherry red) Else Poulsen (rose pink) Fashion (coral peach or salmon orange) Floradora (geranium red) Glorious (Tyrian rose, golden centered) Goldilocks (golden yellow) Magic Red (red) Margaret Koster (orange red) Ma Perkins (salmon pink, flushed gold and red) Ming Toy (red) Orange Triumph (scarlet orange) Pink Abundance (pink) Pink Bountiful (soft pink) Pink Rosette (pink) Pinocchio (pink) Red Pinocchio (carmine red) Red Ripples (red) Rosenelfe (pink) Snowbird (white) Summer Snow (white) Valentine (crimson red) Vogue (begonia red) World's Fair (crimson)	Centennial Miss (deep red) Cutie (patented; pink) Midget (patented; rose red) Oakington Ruby (ruby red) Pixie (patented; pale pink) Rosa Rouletti (deep pink) Sweet Fairy (patented; apple blossom pink) Tom Thumb (patented; red)

Table 3: SOME POPULAR BUSH* ROSES ARRANGED ACCORDING TO COLOR

White	Salmon pink	Flame and carmine	Copper shades
Frau Karl Druschki Kaiserin Auguste Viktoria McGredy's Ivory Neige Parfum Ondine Pedralbes Sleigh Bells Snowbird White Wings	Cheer Countess Vandal (mildews near coast) Cynthia Brooke Good News Horace McFarland Katherine T. Mar- shall Los Angeles Miss Clipper Mission Bells Peach Blow Shot Silk (stands some shade) Sweet Adeline Sweet Sixteen Taffeta	Applause Charlotte Armstrong Grande Duchesse Charlotte Mme. Henri Guillot Tallyho Texas Centennial (not the best for exhibition) The Chief	Apricot Queen Bright Wings (fine as standard) California Chief Seattle Duquesa de Pena- randa Hinrich Gaede (a lit- tle hard to grow) Mrs. Sam McGredy Neville Chamberlain Pres. Plumecocq
Red prevailing	Yellow	Pink	More than one color
Bravo California Centennial Christopher Stone Chrysler Crimson Glory Crimson King Dickson's Red Dr. Kirk E. G. Hill Etoile de Hollande Fandango Flash (climber) Heart's Desire Hector Deane Hoosier Beauty Lucia Zuloaga Major Shelley Mirandy Mrs. Miniver (excel- lent in some places) New Yorker Night Nocturne Piccaninny Poinsettia Rubaiyat San Fernando Southport Victoria Harrington	Buccaneer Debonair Diamond Jubilee Eclipse Fantasia Golden Dawn Golden Emblem Golden Harvest Golden Rapture High Noon (pillar) Joanna Hill Lady Forteviot Lowell Thomas McGredy's Yellow Mme. Chiang Kai- shek Mme. Marie Curie Mrs. E. P. Thom Mrs. Pierre S. Du Pont Narzisse San Luis Rey Sister Therese Sunset Gold Topaz Ville de Paris	Capistrano Charlotte Commando Dame Edith Helen First Love J. Otto Thilow Juno Katherine T. Mar- shall Lulu Mary Margaret McBride Mme. Butterfly Mrs. Edward Laxton Neville Chamberlain Ophelia Picture Pink Dawn Rapture Santa Anita Show Girl Sonata Sterling Susan Louise The Doctor	Ambassador Angel's Mateu Autumn Best Regards Condesa de Sastago Forty-Niner Fred Edmunds Girona Helen Traubel Peace (mostly yellow) Pres. Herbert Hoo- ver San Gabriel Saturnia Signora Talisman

* Bush, unless otherwise indicated. Also see table 2 on smaller roses and table 6 on popular single roses.

Table 4: POPULAR CLIMBING ROSES OF CALIFORNIA

Name	Color
Banksia.....	white, yellow
Belle of Portugal.....	pink
Billy Boiler.....	deep red
Captain Thomas (single).....	creamy yellow
Cecile Brunner.....	pink
Cherokee.....	pink, red, white varieties
Christopher Stone.....	velvety red
Condesa de Sastago.....	gold and copper rose
Countess of Stradbroke.....	red
Countess Vandal.....	coppery salmon
Crimson Glory.....	crimson
Dainty Bess (single).....	soft amber pink
Doubloons.....	yellow
Douglas MacArthur.....	rose, gold, and salmon
Dr. John Gallwey (single).....	white
Duquesa de Penaranda.....	coppery apricot and peach shades
Ednah Thomas.....	light pink
Etoile de Hollande.....	velvety dark red
Flash.....	orange scarlet
Forty-Niner.....	cardinal red with straw yellow reverse
Golden Dawn.....	sunflower yellow
Golden Emblem.....	yellow
Golden Rapture.....	yellow
Gold of Ophir.....	old gold and apricot
Heart's Desire.....	crimson
High Noon (pillar rose).....	yellow
Hinrich Gaede.....	orange vermilion
Hoosier Beauty.....	red
Indian Summer.....	copper, old rose, blush pink
Irish Fireflame (single).....	apricot, terra cotta, and deep orange
J. Otto Thilow.....	rose pink
Kaiserin Auguste Viktoria.....	white
Kitty Kininmonth.....	medium pink
Lady Forteviot.....	reddish gold to apricot
Marechal Niel.....	lemon yellow noisette
Mary Hart.....	velvety red
Max Krause.....	yellow
McGredy's Ivory.....	white
Mermaid (single).....	sulfur yellow
Mme. Butterfly.....	shell pink
Mme. Gregoire Staechelin.....	pink, shaded carmine
Mme. Henri Guillot.....	orange, coral, and red
Mrs. E. P. Thom.....	golden yellow
Mrs. Paul J. Howard.....	rich crimson
Mrs. Pierre S. du Pont.....	yellow
Mrs. Sam McGredy.....	coppery orange
New Dawn.....	blush pink
Night.....	very dark red

Table 4: POPULAR CLIMBING ROSES OF CALIFORNIA (continued)

Name	Color
Paul's Scarlet.....	scarlet red
Peace.....	deep yellow edged cerise
Picture.....	pink
Pink Dawn.....	deep rose
Pinkie (floribunda).....	pink
President Herbert Hoover.....	cerise, flame, buff, and yellow
Rose Anne.....	orange apricot
Rose Marie.....	rose pink
Ruth Alexander.....	orange tints with deep rose shading
Santa Anita.....	deep pink
Shot Silk.....	copper pink with yellow
Show Girl.....	deep pink
Silver Moon.....	creamy white
Snowbird.....	white
Sun Gold.....	golden yellow
Talisman.....	pink and gold
Texas Centennial.....	brick red to rosy red
Victoria Harrington.....	fluted petals of dark velvety red
Ville de Paris.....	light yellow

**Table 5: SOME POPULAR STANDARD OR TREE ROSES,* ARRANGED
ACCORDING TO COLOR**

Red	Yellow	Pink and rose	White	More than one color
Applause	California	Countess Van-	Kaiserin	Angel's Mateu†
Bravo	Debonair	dal	Auguste	Best Regards
Charlotte Arm-	Eclipse†	Dainty Bess†	Viktoria	Bright Wings
strong	Golden Harvest	Fashion	McGredy's	Duquesa de
Christopher	Goldilocks	First Love	Ivory	Penaranda
Stone	Lowell Thomas†	Helen Traubel	Snowbird	Forty-Niner
Chrysler	McGredy's	J. Otto Thilow	White Wings	Fred Edmunds
Crimson Glory	Yellow	Los Angeles		Hinrich Gaede
E. G. Hill	Mme. Chiang	Lulu		Lady Forteviot
Etoile de Hol-	Kai-shek†	Ma Perkins		Mme. Chas.
lande	Mrs. E. P.	Mission Bells		Mallerin
Fandango	Thom	Picture		Mme. Henri
Grande Duchesse	Mrs. Pierre S.	Pinkie		Guillot
Charlotte	du Pont	Rose Marie		Mrs. Sam Mc-
Heart's Desire	Ville de Paris†	Santa Anita		Gredy
Mirandy (needs		Show Girl		Orange Triumph
much heat)		The Doctor		Peace
Mme. Henri				Saturnia
Guillot				Shangri-la
Nocturne				Sister Therese†
Poinsettia				Sutter's Gold
San Fernando				Taffeta
Texas Centen-				Talisman
nial†				Tallyho
Valentine				The Chief
Vogue				Treasure Island

* The full standard roses are budded at a height of about 40 inches; the half standard are budded at about 24 inches. Standards are often propagated on IXL or Ragged Robin, while the half standards are budded on Rosa odorata or Ragged Robin. Other stocks are used occasionally in California.

† Habit of growth too upright for best head.

Table 6: SOME POPULAR SINGLE ROSES

Name	Color
Captain Thomas (climber).....	yellow
Cecil.....	yellow
Colette Clement (nearly single).....	reddish orange
Dainty Bess.....	pink
Innocence (nearly single).....	white
Irish Fireflame.....	pink, bronze, and gold
Isobel.....	coppery pink
Mermaid (climber).....	sulfur yellow
Piccaninny.....	new red
Vesuvius.....	crimson

Table 7: ROSES GRANTED ALL AMERICA AWARD *

Rose honored †	Color	Year of award
Apricot Queen.....	orange and apricot to salmon rose.....	1940
California.....	orange and yellow tones, rose pink reverse.....	1940
Capistrano.....	rose pink.....	1950
Charlotte Armstrong.....	brilliant cerise.....	1941
Chrysler.....	crimson red.....	1953
Diamond Jubilee.....	light shades of buff, yellow, and pale orange.....	1948
Dickson's Red.....	scarlet red.....	1940
Fashion (floribunda).....	coral pink.....	1950
Flash (climber).....	orange scarlet.....	1940
Floradora (floribunda).....	orange scarlet.....	1945
Forty-Niner.....	bicolor, oriental red and chrome yellow.....	1949
Fred Edmunds.....	reddish apricot, aging to orange pink.....	1944
Grande Duchesse Charlotte.....	tomato red shaded geranium red.....	1943
Heart's Desire.....	luminous red.....	1942
Helen Traubel.....	apricot hue.....	1952
High Noon (pillar rose).....	clear yellow.....	1948
Horace McFarland.....	salmon buff.....	1945
Katherine T. Marshall.....	pink suffused with gold.....	1944
Lowell Thomas.....	golden yellow.....	1944
Ma Perkins (floribunda).....	deep salmon pink, flushed gold and red.....	1953
Mary Margaret McBride.....	coral pink suffused with gold.....	1943
Mirandy.....	chrysanthemum red.....	1945
Mission Bells.....	salmon pink to shrimp pink.....	1950
Mme. Chiang Kai-shek.....	lemon yellow.....	1944
Mme. Marie Curie.....	clear yellow.....	1944
Nocturne.....	cardinal red.....	1948
Peace.....	gold, buff, pearly white, and apple blossom.....	1946
Pinkie (polyantha).....	neuron rose.....	1948
Rubaiyat.....	rose red to crimson.....	1947
San Fernando.....	brilliant red.....	1948
Sutter's Gold.....	golden yellow.....	1950
Taffeta.....	changeable pink and yellow tones.....	1948
Tallyho.....	pink on one side, reverse crimson.....	1949
The Chief.....	deep rose to flame, opening coral and copper.....	1940
Vogue (floribunda).....	cherry red.....	1951
World's Fair (floribunda).....	deep crimson.....	1940

* In 1940, the All America Rose Selections began to accept rose entries for All America trial gardens scattered throughout the United States. Sixteen judges now score entries for a two-year period on a uniform point basis. The scores are averaged, and the top rose or roses are honored by an All America Award. Such awards are as nearly impartial as possible, and normally indicate roses of the highest merit. Local rose organizations can indicate which winners may not do well locally and which should be included among the best of the new introductions.

† Bush hybrid tea, except where otherwise noted.

Table 8: SOME FRAGRANT ROSES FOR CALIFORNIA GARDENS

Name	Remarks
Angel's Mateu	blackberry fragrance
Applause	mildly fragrant
Autumn	moderately fragrant
Best Regards	
Betty Prior	
Billy Boiler	
Buccaneer	moderate tea fragrance
California	delicious fragrance
California Centennial	very fragrant
Capistrano	mildly raspberry scented
Chatter	old rose fragrance
Chief Seattle	rich tea fragrance
Christopher Stone	spicy perfume
Chrysler	rich, heady fragrance
Countess Vandal	richly fragrant
Crimson Glory	intensely fragrant
Debonair	old rose fragrance
Diamond Jubilee	moderately fragrant
Dickson's Red	rich fragrance
Donald Prior	fragrant floribunda
Doubloons	spicy fragrance
Duquesa de Penaranda	sweetly perfumed
E. G. Hill	sweetly scented
Etoile de Hollande	old rose fragrance
Fandango	mildly fragrant
Fantasia	
Fashion	old rose fragrance
Feu Joseph Looymans	spicy fragrance
Fiesta	slightly fragrant
First Love	mild, pleasant fragrance
Forty-Niner	pleasant fragrance
Fred Edmunds	fruity fragrance
Girona	fine fragrance
Golden Rapture	mild old rose fragrance
Goldilocks	wild rose fragrance
Grande Duchesse Charlotte	fruity fragrance
Heart's Desire	very fragrant
Helen Traubel	spicy fragrance
Hinrich Gaede	sweet fragrance
Horace McFarland	moderately fruity fragrance
Hoosier Beauty	sweetly scented
Joanna Hill	sweetly fragrant
Katherine T. Marshall	fruity fragrance
Lady Forteviot	pleasing fruity fragrance
Lowell Thomas	moderate tea fragrance
Lucia Zuloaga	fresh strawberry fragrance
Ma Perkins	unusual fragrance
Mark Sullivan	fine fragrance
McGredy's Ivory	delicious fragrance
McGredy's Yellow	sweetly scented

Table 8: SOME FRAGRANT ROSES FOR CALIFORNIA GARDENS (continued)

Name	Remarks
Mirandy.....	delicious fragrance
Miss Clipper.....	
Mission Bells.....	tea scented, mild
Mme. Butterfly.....	sweetly fragrant
Mme. Chiang Kai-shek.....	lemon scented
Mme. Henri Guillot.....	deliciously fragrant
Mme. Marie Curie.....	sweetly fragrant
Mrs. E. P. Thom.....	delightfully fragrant
Mrs. Pierre S. du Pont.....	delightfully fragrant
Mrs. Sam McGredy.....	sweetly fragrant
New Dawn.....	
New Yorker.....	fine fruity fragrance
Night.....	cinnamon fragrance
Nocturne.....	moderately fragrant
Ondine.....	sweetly fragrant
Ophelia.....	sweetly perfumed
Peace.....	
Piccaninny.....	cinnamon fragrance
Picture.....	sweet tea fragrance
Pink Bountiful.....	rich fragrance
Pink Dawn.....	sweet fragrance
Pinkie.....	spicy fragrance
Pinocchio.....	delightful fragrance
Pres. Herbert Hoover.....	delicious fragrance
Radiance.....	fragrant
Ramon Bach.....	
Rapture.....	delightful perfume
Rubaiyat.....	old rose fragrance
San Fernando.....	exceptionally fragrant
San Luis Rey.....	very fragrant
Saturnia.....	very fragrant
Shot Silk.....	
Show Girl.....	mild fragrance
Signora.....	very fragrant
Sleigh Bells.....	
Snowbird.....	very fragrant
Sonata.....	
Southport.....	tea scent
Sutter's Gold.....	rich tea fragrance
Sweet Sixteen.....	sweetly scented
Taffeta.....	pronounced fragrance
Talisman.....	richly fragrant
Tallyho.....	spicy, full bodied
Tango.....	spicy fragrance
The Chief.....	sweet fragrance
The Doctor.....	sweetly fragrant
Vesuvius.....	nice fragrance
Ville de Paris.....	
Yours Truly.....	damask fragrance

REFERENCES

Books

- ALLEN, R. C.
1948. *Roses for every garden.* (218 p.) M. Barrows and Company, Inc., New York.
1951. *What every rose grower should know.* 4th ed. (78 p.) American Rose Society, Harrisburg, Pa.
- HARVEY-CANT, F. S.
1951. *Rose selection and cultivation.* (139 p.; colored illustrations.) MacGibbon and Kee, London.
- MANSFIELD, T. C.
1943. *Roses in color and cultivation.* (263 p.) Dutton and Company, New York.
- McFARLAND, JOHN HORACE
1936. *Roses of the world in color.* (296 p.; illustrated; map.) Houghton Mifflin Company, New York.
1947. *Modern roses.* 3d ed. (286 p.) J. H. McFarland Co., Box 687, Harrisburg, Pa.
- McFARLAND, JOHN HORACE, and ROBERT PYLE
1946. *How to grow roses.* 20th ed. (191 p.) J. H. McFarland Co., Box 687, Harrisburg, Pa.
- NICHOLAS, J. H.
1938. *The rose manual.* Rev. ed. (335 p.; plates and map.) Doubleday, Doran and Company, Garden City, New York.
- ROCKWELL, FREDERICK FRYE
1930. *Roses.* (88 p.) The Macmillan Company, New York.
- SHARP, M. L.
1951. *Roses illustrated and how to grow them.* (160 p.; 354 illustrations.) Western Trail Pubs., 72 S.W. Yamhill St., Portland 4, Ore.
- STEVENS, G. A.
1933. *Climbing roses.* (220 p.) The Macmillan Company, New York.
- TAYLOR, GEORGE MORRISON
1949. *Book of the rose.* (176 p.) Macdonald and Co., 37 Madison Avenue, New York 10.
- THOMAS, A. S.
1952. *Better roses.* (295 p.) Anglobooks, 475 Fifth Ave., New York 17.
- WESTCOTT, CYNTHIA
1952. *Anyone can grow roses.* (147 p.) Van Nostrand, New York.

Serial Publications

- MIDDLETON, WILLIAM
1922. *Sawflies injurious to rose foliage.* (14 p.; illustrated.) U.S.D.A. Farmers' Bul. 1252.
- MULFORD, FURMAN LLOYD
1932. *Roses for the home.* (34 p.; illustrated.) U.S.D.A. Farmers' Bul. 750 (rev.).

In order that the information in our publications may be more intelligible it is sometimes necessary to use trade names of products or equipment rather than complicated descriptive or chemical identifications. In so doing it is unavoidable in some cases that similar products which are on the market under other trade names may not be cited. No endorsement of named products is intended nor is criticism implied of similar products which are not mentioned.

Co-operative Extension work in Agriculture and Home Economics, College of Agriculture,
University of California and United States Department of Agriculture co-operating.
Distributed in furtherance of the Acts of Congress May 8 and June 30, 1914.
J. Earl Coke, Director, California Agricultural Extension Service.

THIS BOOK IS DUE ON THE LAST DATE
STAMPED BELOW

Net price 25c